

What is claimed is:

1. An integrated polarization splitter, comprising:  
an arrayed waveguide grating (AWG) including:  
5 an input coupler;  
an output coupler; and  
a plurality of waveguides of unequal length connecting said input and output couplers;  
wherein at least two output ports of said AWG are positioned relative to an  
10 input port such that a first polarization component and a second polarization component of a single channel input signal arriving at different phase fronts of a free space region at an output side of said AWG are respectively received by separate ones of said output ports such that said first polarization component and said second polarization component are split by said AWG; and  
15 wherein said polarization splitter is integrated using active/passive monolithic integration techniques such that said polarization splitter is capable of being integrated with active devices as well as passive devices.
2. The polarization splitter of claim 1, wherein said first polarization  
20 component comprises a TE mode and said second polarization component comprises a TM mode of said input signal.
3. The polarization splitter of claim 1, wherein the polarization of input signals separated in wavelength from said single channel input signal by integer  
25 multiples of the free spectral range of said AWG is also split by said AWG.
4. The polarization splitter of claim 1, wherein at least one of said output coupler and said input coupler comprises a star coupler.
- 30 5. The polarization splitter of claim 1, wherein at least one of said output coupler and said input coupler comprises a slab waveguide lens.

6. The polarization splitter of claim 1, wherein said polarization splitter performs at least one of wavelength multiplexing and demultiplexing for input signals comprising more than a single channel.
- 5 7. The polarization splitter of claim 1, wherein said polarization splitter performs channel filtering.
8. The polarization splitter of claim 1, wherein said polarization splitter is fabricated from optical waveguides, each of said optical waveguides  
10 comprising:  
a shallow etched buried rib structure passive layer; and  
a thin layer of multi-quantum-wells (MQW) on top of the buried rib structure functioning as an active layer.
- 15 9. The polarization splitter of claim 1, wherein said polarization splitter further functions as a tunable polarization controller.
10. An integrated polarization splitter, comprising:  
an arrayed waveguide grating (AWG) including:  
20 at least one input means for receiving an input signal;  
a means for coupling said input signal to said AWG;  
a means for coupling an output signal from said AWG;  
a plurality of waveguides of unequal length connecting said input coupling means and said output coupling means; and  
25 at least two output means;  
wherein said at least two output means of said AWG are positioned relative to said at least one input means such that a first polarization component and a second polarization component of said input signal arriving at different phase fronts of a free space region of said output coupling means of said AWG  
30 are respectively received by separate ones of said output means such that said first polarization component and said second polarization component are split by said AWG; and

wherein said polarization splitter is integrated using active/passive monolithic integration techniques such that said polarization splitter is capable of being integrated with active devices as well as passive devices.

5     11.     The integrated polarization splitter of claim 10, wherein said input signal is a single channel input signal.

12.     The integrated polarization splitter of claim 10, wherein said first polarization component comprises a TE mode and said second polarization  
10     component comprises a TM mode of said input signal.

13.     The integrated polarization splitter of claim 10, wherein the polarization of input signals separated in wavelength from said input signal by integer multiples of the free spectral range of said AWG is also split by said AWG.

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14.     A method of fabricating a polarization splitter, comprising:  
integrating an arrayed waveguide grating using an active/passive monolithic integration technique, wherein at least two output ports of said AWG are positioned relative to an input port such that a first polarization component and a second polarization component of a single channel input signal arriving at  
20     different phase fronts of a free space region at an output side of said AWG are respectively received by separate ones of said output ports such that said first polarization component and said second polarization component are split by said AWG.

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